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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/344,169	06/24/1999	WILLIAM ERIC CORR	30454-230	8742

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EXAMINER

JONES, HUGH M

ART UNIT PAPER NUMBER

2123

DATE MAILED: 03/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/344,169

Applicant(s)

Corr

Examiner

Hugh Jones

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jun 24, 1999
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Jun 24, 1999 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

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DETAILED ACTION

Introduction

1. Claims 1-8 of U. S. Application 09/344,169, filed on 24-June-1999, are presented for examination. Applicants have not numbered the lines in the application - therefore, the Examiner will refer to page and paragraph number, when referencing the application. If this is inconvenient, Applicants may wish to correct the deficiency.

Priority

2. Applicant is advised of *possible* benefits under 35 U.S.C. 119(a)-(d), wherein an application for patent filed in the United States may be entitled to the benefit of the filing date of a prior application filed in a foreign country.

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in the UK on 7/2/1998. It is noted, however, that applicant has not filed a certified copy of the application as required by 35 U.S.C. 119(b).

4. The Examiner will assume a priority date of 6/24/1999, for purposes of examination.

Specification

5. The abstract of the disclosure is objected to because it refers to figure 4 and the title on the same page as the abstract. Correction is required. See MPEP § 608.01(b)

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Drawings

6. **Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated.** See MPEP § 608.02(g). Note page 3, description of figure 1 (Applicants have not numbered the lines in the application).

Information Disclosure Statement

7. It is noted that Applicants have not provided an IDS. Applicants have admitted that they are aware of prior art - see description of figure 1, page 1 of the specification and the last sentence of the last full paragraph on page 7 of the specification. Furthermore, electromagnetic coupling as it relates to IC design and timing is extremely well known. As these references are not readily available to the Examiner, the applicant should provide the office with copies of the reference in any response to this action.

8. Applicant is **reminded** of their duty to disclose all information material to the patentability of the application.

37 C.F.R. 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim

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is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and

- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

- (b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a *prima facie* case of unpatentability of a claim; or

- (2) It refutes, or is inconsistent with, a position the applicant takes in:

- (i) Opposing an argument of unpatentability relied on by the Office, or

- (ii) Asserting an argument of patentability.

A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the

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specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

Claim Objections

9. The following is a quotation of 37 C.F.R. § 1.75 (d)(1):

The claim or claims must conform to the invention as set forth in the remainder of the specification and terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

10. Claims 1-8 are objected to because of the following. Appropriate correction and/or explanation is required.

- Claims 1 and 8 include portions of claim limitations in parentheses which should be deleted.

- claims 1 and 8 refer to “perturbation” coupling. This does not appear to be a standard term in the art. Its meaning, in the context of the invention is unknown, and should be reworded. Perhaps “*electromagnetic* coupling”?

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- Claim 6 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 6 is functionally identical to claim 3. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. **Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.**

13. The specification provides little detail pertaining to determining topological effects on crosstalk, calculating the relationship between clocked timing and crosstalk, operating conditions (as in claim 2), nature of the aggressor wire (as in claim 2), determination/calculation of timing margins which take into account crosstalk, and scaling (as in claim 7).

14. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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15. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claim 1, for example, recites, in part, "... *of the victim wires **independence** upon the number of aggressor wires...*". The meaning of this passage is unknown. The dependent claims inherit this defect.

- Claim 2 refers to "the ***nature*** of aggressor wire". The meaning of ***nature*** is unknown.

- Claim 2 refers to "operating conditions". The meaning of the term is unknown. Does this mean operating condition of the aggressor wire, victim wire or the entire circuit?

- claim 7 refers to "***topological coupling***". The meaning of the term is unknown.

Claim Interpretations

16. The Examiner has interpreted the claims as subsequently discussed.

17. Claim 1, for example, recites, in part, "... *of the victim wires **independence** upon the number of aggressor wires...*". The meaning of this passage is unknown. The dependent claims inherit this defect. The Examiner interprets that it should be "***dependence upon***", and will examine upon such basis.

18. Applicants have admitted [last sentence of the last full paragraph on page 7 of the specification] that those of ordinary skill in the art at the time of the invention would have known the details pertaining to the calculation of coupling in various geometries.

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19. The broadest reasonable interpretation of the claim language has been give to claims 1-8. Claim 8 has been interpreted in view of 35 U.S.C. 112, and *In re Donaldson*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994). Reciting the pertinent section of 35 U.S.C. 112, paragraph six:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof ,and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

20. “Means For” language is present in the specification (“Summary of the Invention”). The Examiner interprets that this only refers to other portions of the specification. Applicants have not incorporated any material into the specification. Therefore, claim 8 only refers, via “means for” language, to the four corners of the specification.

21. Applicant’s invention will be interpreted as discussed for purposes of a prior art rejection.

Claim Rejections - 35 USC § 102

22. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

23. A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

24. Claims 1-8 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Gao et al. or Petschauer et al..

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25. *Gao et al.* disclose “*Minimum crosstalk channel routing.*” They further disclose that as technology advances, interconnection wires are placed in closer proximity and circuits operate at higher frequencies. Consequently, reduction of crosstalk between interconnection wires becomes an important consideration in VLSI design. In this paper, they study the gridded channel routing problem with the objective of satisfying crosstalk constraints for the nets. They propose a new approach to the problem which *utilizes existing channel routing algorithms and improves upon the routing results by permuting the routing tracks. The permutation problem is proven to be NP-complete.* A novel mixed ILP formulation and effective procedures for reducing the number of variables and constraints in the mixed ILP formulation are then presented. *Gao et al.* further disclose determining whether a line is critical (page 465, col. 1); crosstalk constraints and “ranking” of critical conductors (page 465, col. 2, first full paragraph; page 466, section II, first paragraph); ranking and routing the channels (page 465, col. 2, second paragraph to end of section I, page 466; page 466, section II, first and second paragraphs); and track permutations (page 467, col. 1, last paragraph to page 470, end of section IV) and timing slack (pg. 472, col. 2 to pg 473).

26. Petschauer et al. disclose a method according to the present invention, an integrated circuit chip is fabricated by the following steps:

- 1) providing a trial layout in the chip for a victim net and a set of aggressor nets which have segments that lie next to the victim net;

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2) assigning to the trial layout of the victim net, the parameters of a line capacitance, a line resistance, and a driver output resistance; and assigning to the trial layout of each aggressor net, the parameters of a coupling capacitance to the victim net, and a voltage transition;

3) estimating, for each aggressor net, a respective peak crosstalk voltage $V_{sub.p}$ which the aggressor net couples into the victim net as a function $V_{sub.p} = K(e^{sup.-X} - e^{sup.-Y})$ where K , X , and Y are products of said parameters;

4) modifying said trial layout and repeating the assigning and estimating steps until a summation of the estimated peak crosstalk voltages in the victim net is within an acceptable level; and,

5) building the chip with the modified layout for which the summation is within the acceptable level.

27. See particularly: fig. 1 (topology), fig. 5a-6 (influence of switching rate on crosstalk - grouped), fig. 8 (margin), fig. 11 (aggressor transitions), fig. 19, 25 (grouping).

28. Claims 1-8 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Carlson et al..

29. Carlson et al. disclose a method for *analyzing cross-coupling between an attacker signal line, upon which an attacker signal resides, and a victim signal line, upon which a victim signal resides*. The method in the present invention comprises the acts of *selecting the victim signal, selecting the attacker signal, performing timing filtering on a plurality of signal lines to identify a first set of potential attacker signals on a first set of potential attacker signal lines, performing*

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logic filtering on the plurality of signal lines to identify a second set of potential attacker signals on a second set of potential attacker signal lines, and reducing the effects of the cross-coupling between at least one of the said potential attacker signal lines and the victim signal line.

30. In particular, Carlson et al. (Fig. 1, 3-5, 7 and corresponding text) discloses timing delay prediction; determine electromagnetic coupling between aggressor and victim wires; group the aggressor wires as a function of timing; adjust timing margin so that coupling does not affect circuit switching; take into account signal strengths (claim 2); group aggressor wires into likely, possible, unlikely; consider only likely; consider only likely and possible; scaling the aggressor wires (claim 7).

31. Any inquiry concerning this communication or earlier communications from the examiner should be:

directed to:

Dr. Hugh Jones telephone number (703) 305-0023, Monday-Thursday 0830 to 0700 ET, *or* the examiner's supervisor, Kevin Teska, telephone number (703) 305-9704. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to:

Commissioner of Patents and Trademarks

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Washington, D.C. 20231

or faxed to:

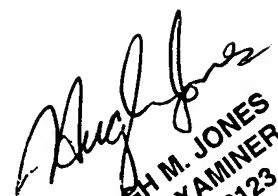
(703) 308-9051 (for formal communications intended for entry) *or*

(703) 308-1396 (for informal or draft communications, please label "*PROPOSED*" or "*DRAFT*").

Respectfully submitted,

Dr. Hugh Jones

March 18, 2002


DR. HUGH M. JONES
PATENT EXAMINER
ART UNIT 2123